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putrefaction of the albumen; but I have found as manifest indications of sugar in a fresh laid egg as in one that had been kept for several days."

APRIL 9TH, 1849.

REV. HUMPHREY LLOYD, D. D., PRESIDENT, in the Chair.

Daniel Brady, M. D.; Benjamin Lee Guinness, Esq.; Henry Kennedy, M. B.; and Hon. Thomas Vesey, M. P.; were elected members of the Academy.

Mr. Donovan read a paper on the Preparation of Phosphorus.

The early processes of Hellot, Dolfuss, Henckel, Margraaf, and others, were first commented on, and their disgusting, troublesome, and inefficient nature pointed out.

At this time the price of phosphorus was enormous. Mr. Boyle induced a chemist to adopt a new method, which enabled him to produce phosphorus so abundantly, that its price fell to six guineas per ounce. At present it may be purchased for half as many shillings.

But when Gahn discovered that the earthy part of bone consists of phosphate of lime, a more abundant source of phosphorus was made known to chemists. From two pounds of bone ashes, Wiegleb obtained ten drachms and a half of phosphorus; Dolfuss, rather less than five drachms; and Pelletier sometimes so much as three ounces.

Observations were made on the practical difficulties, defects, and great trouble of the bone-ash process; and remedies were pointed out. It was shown that bones are procurable in various commercial states, viz., in coarse powder, for the purposes of agriculture; burned to blackness in the process for obtaining carbonate of ammonia; or in small particles from the lathe of the bone turner. In all these states bones afford phosphate of lime; but there are other sources, the most abundant of which are the horns of certain animals. The result of some trials was stated, from which it appeared that recent sheep bone (the leg), when burned to whiteness, afforded 38·71 per cent. of earthy matter; and recent ox-ribs, 37·14 per cent. In neither case were the moisture and fatty matter previously withdrawn, and this is the cause of the difference between these estimates and those that have been hitherto published. With regard to horn, the incineration to whiteness of shavings of hartshorn returned, on an average of many trials, 62 per cent. of phosphate of lime.

These different forms of bone and horn present us with phosphate of lime, in states which possess different advantages; some hold out the inducement of cheapness, some of facility in employing them; all of them answer the purpose. Hartshorn shavings, beside phosphate of lime, contain a light, highly nutritious, and most agreeable jelly, which has found its way to the kitchen, the nursery, and the sick room, and which may be preserved after the shavings have yielded their earth.

In order to remove the animal matter from the earthy portion of bones, the process of calcination is resorted to, but this is uneconomical and troublesome. It is better and easier to withdraw the earthy portion from the animal matter by digestion in very dilute nitric acid; the earthy salts will be thus dissolved away, and the cartilage will remain unaltered. The phosphoric acid may be withdrawn from the solution by means of a salt of lead. Chloride of lead does not succeed, the nitrate will not be more successful, but the acetate answers perfectly. The cartilage which remains may be converted to a variety of purposes, as for making glue and size.

On economical grounds, bones, not burned, but crushed between rollers for agricultural purposes, were recommended as the proper source from which phosphorus, on the large scale, is to be procured. On the small scale, shavings of hartshorn were stated to be more convenient.

Estimates were then given of the quantities of the materials to be employed under various circumstances, with their cost, and the mode of manipulation. Directions were given for recovering the acetic acid disengaged in the process, and reconverting it into acetate of lead for future precipitations of bone solutions. An easy method of drying and reducing the volume of the phosphate of lead obtained was described. The paper concluded with two formulæ for obtaining phosphorus, founded on the facts stated, which it was conceived reduce the trouble and cost of preparing that article to the lowest scale of which it is susceptible.

Mr. H. L. Renny read a paper on the effects of moisture as affecting the barometric measurement of heights.

" Whereas Dr. Apjohn has inserted in a note of a paper read by him before the Academy, and published in vol. ii. of the Proceedings of the Academy (1840–1844), at page 565, an expression for the correction due to the hygrometric state of the atmosphere, in the formulæ for the measurement of heights by the barometer, which expression, as the note states, was furnished to Dr. Apjohn by myself, I hope I do not request unnecessarily the attention of the Academy to the process by which I obtained the said formula.

$$\text{Let } \left.\begin{array}{l} p \text{ be pressure,} \\ f \text{ be the force of aqueous vapour,} \end{array}\right\} \text{at the lower station.}$$

$$\left.\begin{array}{l} p' \text{ be pressure,} \\ f' \text{ be the force of aqueous vapour,} \end{array}\right\} \text{at the upper station.}$$

$$\left.\begin{array}{l} \pi \text{ be pressure,} \\ F \text{ be the force of aqueous vapour,} \end{array}\right\} \begin{array}{l} \text{at any station what-} \\ \text{ever, } \pi \text{ and } F \text{ being,} \\ \text{of course, variable.} \end{array}$$

n be a number extremely great.

δ be a quantity indefinitely small.